



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,394	03/02/2004	Akira Yamaguchi	09792909-5825	2580

26263 7590 04/04/2006

SONNENSCHN NATH & ROSENTHAL LLP
P.O. BOX 061080
WACKER DRIVE STATION, SEARS TOWER
CHICAGO, IL 60606-1080

EXAMINER

PARSONS, THOMAS H

ART UNIT	PAPER NUMBER
----------	--------------

1745

DATE MAILED: 04/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/791,394	Applicant(s) YAMAGUCHI ET AL.	
	Examiner Thomas H. Parsons	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The examiner suggests amending the abstract of the instant specification, as appropriate, to within the 50 to 150 word range.

Claim Rejections - 35 USC § 102

- (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.
2. Claims 1-3 and 5-11, 14-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Shibuya et al. (6,509,123).

Claim 1: Shibuya et al. in Figures 1-3 disclose a battery (1) comprising:

a cathode (2)(col. 3: 18-35 and col. 6: 50-60),

an anode (3) (col. 3: 18-35 and col. 6: 50-60), and

an electrolyte (4) (col. 3: 18-35), wherein the electrolyte contains

Art Unit: 1745

a high molecular weight compound (col. 5: 36-42 which are the same as those instantly disclosed),

a solvent containing a high viscosity solvent whose boiling point is more than 150 °C. and a low viscosity solvent whose boiling point is 150 °C. or less (col. 4: 61-col. 5: 11 which are the same as those instantly disclosed), and

an electrolyte salt (col. 5: 12-19 which are the same as those instantly disclosed).

The recitation “the electrolyte is formed by firstly forming coating layer containing the high molecular weight compound, the high viscosity solvent, and the electrolyte salt on the cathode and the anode, and then injecting an injection solution containing the low viscosity solvent in the coating layer” has been considered and construed as a product by process limitation that adds no additional limitation to the electrolyte.

Claim 2: Shibuya et al. disclose that a content of the electrolyte salt in the electrolyte is in the range of 0.36 mol/kg to 1.52 mol/kg in relation to the solvent. Specifically, Shibuya et al. disclose not less than 0.4 mol/kg and not greater than 1.0 mol/kg (col. 5: 19-28).

Claim 3: Shibuya et al. disclose that the electrolyte contains an electrolyte salt (col. 5: 12-19) in the range of 0.1 mol/kg to 3.5 mol/kg in relation to the low viscosity solvent. More particularly, Shibuya et al. disclose high and low viscosity solvent (col. 4: 61-67) that can be used solely or in combination (col. 5: 1-2) and that the electrolyte is not less than 0.4 mol/kg and not greater than 1.0 mol/kg with respect to the solvent (col. 5: 19-28).

The recitation “the electrolyte is formed by using the injection solution” has been considered and construed as a product by process limitation that adds no additional limitation to the electrolyte.

Art Unit: 1745

Claim 5: Shibuya et al. disclose that the electrolyte contains ethyl methyl carbonate (col. 4: 61-67).

As to the recitation “the electrolyte is formed by using the injection solution”, see claim 3 above.

Claim 6: Shibuya et al. disclose that the electrolyte contains diethyl carbonate (col. 4: 61-67).

As to the recitation “the electrolyte is formed by using the injection solution”, see claim 3 above.

Claim 7: Shibuya et al. disclose that the electrolyte contains dimethyl carbonate (col. 4: 61-67).

As to the recitation “the electrolyte is formed by using the injection solution”, see claim 3 above.

Claim 8: Shibuya et al. disclose that the electrolyte contains LiPF_6 (col. 5: 12-19)

As to the recitation “the electrolyte is formed by using the injection solution”, see claim 3 above.

Claim 9: Shibuya et al. disclose that the electrolyte contains $\text{LiN}(\text{SO}_2\text{CF}_3)_2$ (col. 5: 12-19)

As to the recitation “the electrolyte is formed by using the injection solution”, see claim 3 above.

Claim 10: Shibuya et al. disclose that the electrolyte contains $\text{LiN}(\text{SO}_2\text{C}_2\text{F}_5)_2$ (col. 5: 12-19)

Art Unit: 1745

As to the recitation “the electrolyte is formed by using the injection solution”, see claim 3 above.

Claim 11: Shibuya et al. disclose that the electrolyte contains LiBF_4 (col. 5: 12-19)

As to the recitation “the electrolyte is formed by using the injection solution”, see claim 3 above.

Claim 14: Shibuya et al. in Figures 1-3 disclose that the are housed inside of a film exterior member (6)(col. 5: 44-49).

Claim 15: The rejection of claim 15 is as set forth above in claim 1 wherein further because Shibuya et al. disclose the same electrolyte as that instantly claim, the electrolyte of Shibuya et al. anticipates a concentration of the low viscosity solvent in the electrolyte that changes in the facing direction of the cathode and the anode, and a concentration of the low viscosity solvent in the electrolyte is higher between the cathode and the anode compared to on the cathode side and the anode side.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shibuya et al. as applied to claim 1 above.

Claim 4: Shibuya et al. disclose high and low viscosity solvent (col. 4: 61-67) that can be used solely or in combination with a predetermined mixing ratio, (col. 5: 1-2) and that the electrolyte is not less than 0.4 mol/kg and not greater than 1.0 mol/kg with respect to the solvent (col. 5: 19-28).

Therefore, depending upon the combination of solvents (low viscosity and or low viscosity solvent(s) and there predetermined mixing ratio, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have provided an electrolyte which contains an electrolyte salt in relation to the lower viscosity solvent having a higher concentration than a content of an electrolyte salt in relation to the high viscosity solvent

The recitation “the electrolyte is formed by using the injection solution” has been considered and construed as a product by process limitation that adds no additional limitation to the electrolyte.

5. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shibuya et al. as applied to claim 1 above, and further in view of Yamahira et al. (5,601,950).

Shibuya et al. are as applied, argued, and disclosed above, and incorporated herein.

Claims 12 and 13: Shibuya et al. in Figures 1-3 disclose an anode comprising an anode current collector and an anode mixture layer provided on the anode current collector but are silent as to a volume density of the anode mixture layer is from 1.0 g/cm³ to 2.2 g/cm³ and an average void diameter of the anode mixture layer is from 0.2 μm to 5 μm.

Claim 12: Yamahira et al. disclose a volume density of the anode mixture layer from 1.0 g/cm³ to 2.2 g/cm. More particularly, Yamahira et al. disclose a volume density of from about 8

Art Unit: 1745

to about 1.96 g/cm^3 (col. 3: 20-23, col. 5: 40-41, col. 6: 3-4, 16-17, 39-40, and 55-56, col. 8: 37-40, 48-50, and 59-61, col. 9: 2-3 and 11-13).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the anode mixture layer of Shibuya et al. by incorporating a volume density of from about 8 to about 1.96 g/cm^3 because Yamahira et al. teach a volume density that would improved the amount of active material packed in the negative electrode, improved energy density, charging/discharging efficiency, and electrical conductivity thereby improving the overall performance of the battery.

Further, because the anode mixture layer of the Shibuya et al. combination is similar to what is instantly disclosed in terms of its composition, manner in which it is made, and volume density, it obviously would provided an average void diameter of from $0.2 \text{ }\mu\text{m}$ to $5 \text{ }\mu\text{m}$.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas H. Parsons whose telephone number is (571) 272-1290. The examiner can normally be reached on M-F (7:00-4:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1745

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas H Parsons
Examiner
Art Unit 1745


PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER